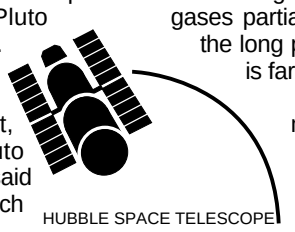
Hubble reveals surface of Pluto for first time

For the first time since Pluto's discovery 66 years ago, astronomers have at last directly seen details on the surface of the solar system's farthest planet from pictures sent by the European Space Agency's Faint Object Camera on NASA's Hubble Space Telescope.

Hubble's snapshots of nearly the entire surface of Pluto, taken as the planet rotated through a 6.4-day period, show that Pluto is a complex object, with more large-scale contrast than any planet, except Earth.

The images also reveal almost a dozen distinctive albedo features, or provinces, none of which have ever been seen before. They include a "ragged" northern polar cap bisected by a dark strip, a bright spot seen rotating with the planet, a cluster of dark spots and a bright linear marking that is intriguing the scientific team analyzing the images. The images confirm the presence of icy-bright polar cap features, which had been inferred from indirect evidence for surface markings in the 1980s.

This historic new look at Pluto helps pave the way for a proposed Pluto flyby mission in the next century. Pluto is the only solar system planet not yet visited.



"Hubble is providing the first, tantalizing glimpse of what Pluto will be like when we get there," said Alan Stern of Southwest Research Institute's Boulder, Colo.

Some of the sharp variations across Pluto's surface detected in the Hubble images may potentially be caused by such topographic features as basins, and fresh impact craters However, most of the surface features unveiled by Hubble are likely produced by the complex distribution of frosts that migrate across Pluto's surface with its orbital and seasonal cycles. Pluto is so far from the Sun that even nitrogen, carbon monoxide and methane gases partially freeze onto its surface during the long period—about 100 years—when it is farthest from the Sun.

The Hubble images reveal much more surface variety on Pluto than on other icy objects in the outer solar system, including Pluto's often-cited twin, Neptune's large moon Triton. Scientists are confirming Pluto isn't a twin of Triton after all.

During the short, warm season around Pluto's closest approach to the Sun, these ices sublimate—go directly back to a gas—thickening Pluto's atmosphere.

"The light areas are as bright as fresh Colorado snow, and the darker areas are more reminiscent of the brightness of a dirty snow," said Stern.

The darkest regions likely result from hydrocarbon "residues" from the effects of ultraviolet sunlight and cosmic rays on Pluto's complex chemical melange of surface ices.

Pluto is two-thirds the size of Earth's Moon, and 1,200 times farther away. Pluto's apparent size in the sky is so small that 18,000 Plutos would need to be lined up to match the diameter of the full Moon. This puts Pluto's surface below the resolution limit of the largest ground-based telescopes; as a result it has been impossible to directly see any significant detail on Pluto before these Hubble observations. Images of Pluto can be seen on the Internet at: http://www.hq.nasa.gov/office/pao/NewsRoom/today.html

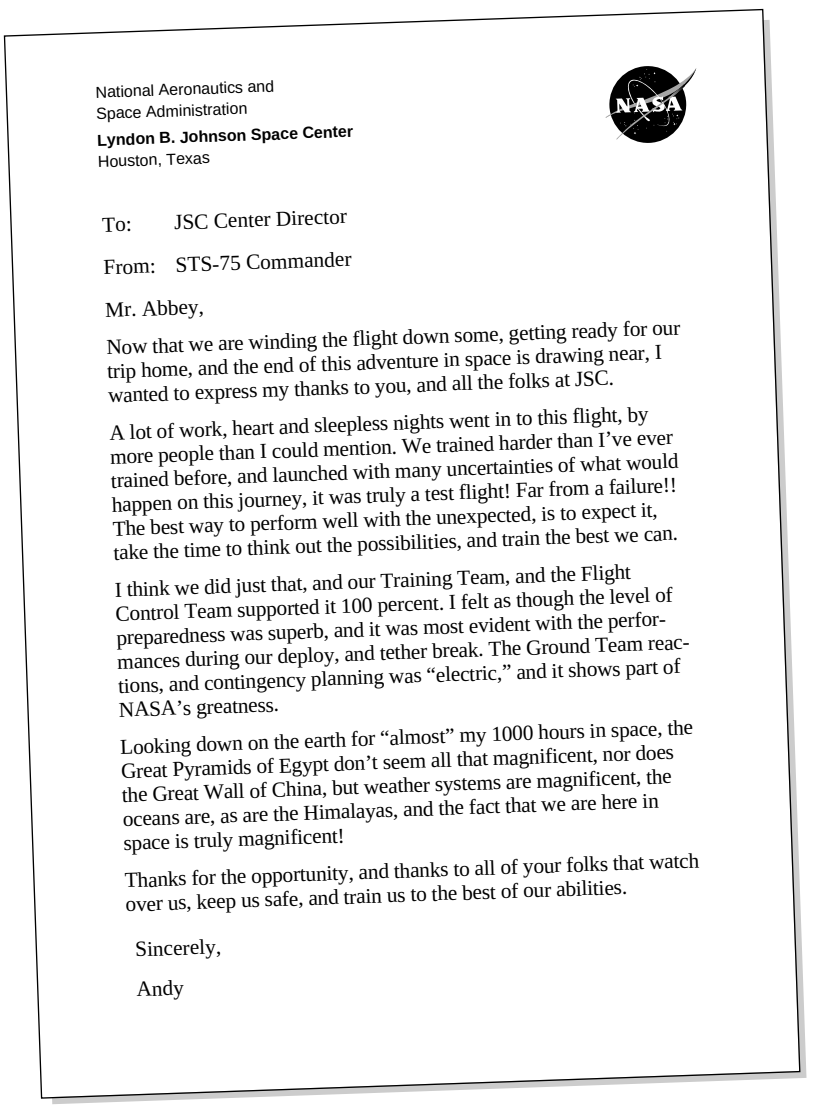
STS-75 crew shares flight memories

The STS-75 astronauts will share flight memories with employees and receive their space flight medals at 3 p.m. March 25 in Teague Auditorium.

Commander Andy Allen, Pilot Scott Horowitz, Mission Specialists Jeff Hoffman, Maurizio Cheli, Claude Nicollier and Franklin Chang-Diaz and Payload Specialist Umberto Guidoni will discuss scientific investigations performed during their 15-day mission in low Earth orbit.

The crew conducted a variety of experiments in the United States Microgravity Payload collecting more than their anticipated data on fire-related phenomena and materials processing, and the Tethered Satellite team gained knowledge to shape the future of tethered satellites in space.

The astronauts also will receive their space flight medals in recognition of their courage, dedication, professional skills and for being pioneers who have widened the world's understanding and mastery of the new ocean of space. Later that same week, the crew will discuss their mission with the public at noon March 29 at Space Center Houston.



National Aeronautics and Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

To: JSC Center Director

From: STS-75 Commander

Mr. Abbey,

Now that we are winding the flight down some, getting ready for our trip home, and the end of this adventure in space is drawing near, I wanted to express my thanks to you, and all the folks at JSC.

A lot of work, heart and sleepless nights went in to this flight, by more people than I could mention. We trained harder than I've ever trained before, and launched with many uncertainties of what would happen on this journey, it was truly a test flight! Far from a failure!! The best way to perform well with the unexpected, is to expect it, take the time to think out the possibilities, and train the best we can.

I think we did just that, and our Training Team, and the Flight Control Team supported it 100 percent. I felt as though the level of preparedness was superb, and it was most evident with the performances during our deploy, and tether break. The Ground Team reactions, and contingency planning was "electric," and it shows part of NASA's greatness.

Looking down on the earth for "almost" my 1000 hours in space, the Great Pyramids of Egypt don't seem all that magnificent, nor does the Great Wall of China, but weather systems are magnificent, the oceans are, as are the Himalayas, and the fact that we are here in space is truly magnificent!

Thanks for the opportunity, and thanks to all of your folks that watch over us, keep us safe, and train us to the best of our abilities.

Sincerely,

Andy

Experts to discuss new laser eye surgery Monday

In response to questions from JSC employees concerning the current techniques available to correct vision, the Total Health Program will present a Lunch 'n Learn seminar to discuss PRK or Photorefractive Keratectomy, sometimes known as Laser Vision correction.

"PRK Laser Vision Correction" will be held from 11:30 a.m.-12:30 p.m. Monday in the Bldg. 30 Auditorium. Experts, Bernard Milstein, Allan Fradkin and Daniel Gold, from the Eye Clinic of Texas will be on hand to discuss PRK as well as RK nearsightedness correction. The physicians will remain in the Bldg. 30 auditorium until 2:30 p.m.

"This will give employees who could not attend the seminar the opportunity to stop by to speak with the experts," said Lynn Hogan, chief nurse in the JSC Clinic. "Any employee is welcome to bring their glasses or contact lens prescription with them. The prescription can be analyzed to determine whether this procedure would be of benefit to the employee."

PRK is a process by which a concentrated beam of ultra-violet light emitted from an Excimer laser gently reshapes the cornea so that light rays focus the way they should, directly on the retina. By changing the shape of the cornea it is possible to change the way a person sees.

This is a state of the art procedure to correct nearsightedness using a computerized laser. The aim is to reduce or eliminate the need for glasses and contact lenses.

PRK is different form RK or radial keratotomy because it uses a computerized cool beam Excimer laser to gently re-shape the cornea. There are no incisions made with PRK and because the amount of tissue to be removed is directed by a computer, it is considered to be an extremely precise procedure.

RK uses a diamond dipped knife to cut a series if incisions into the cornea. By making the incisions in a radial or "pinwheel" shape, the surface of the cornea is flattened.

For more information on PRK or the seminar, call the Clinic at x34111.

Employees report to work Monday

The continuing resolution that has kept NASA's doors open since early January will expire at midnight today.

News stories have reported conflicting messages regarding the likelihood of new legislation to keep the government operating. In light of this uncertainty, JSC is again planning for the possibility of a partial government shutdown. Employees are reminded that no matter what happens, they are expected to report to work Monday morning. If, at that point, no CR has been passed, the center will then begin an orderly shutdown.

The Human Resources office is currently working with organizations to update lists identifying employees who will be required to work if a furlough occurs. Employees who are exempt are those necessary to ensure the safety and security of life and property, perform essential contract management and to maintain the shuttle manifest and space station critical milestones.

Employees are encouraged to follow news media reports on the status of NASA's budget legislation. In addition, before close of business today, all employees are asked to provide their supervisors with a telephone number or other means by which they can be reached. Employees can also get the latest details by calling the Employee Information Service at x36765.

STS-75 crew laud international effort

(Continued from Page 1)

go and make this program go and make it the success that it is," Horowitz said. "I would like to thank everyone for the incredible, incredible adventure that we were on."

Nicollier reflected on the scientific experiments and the vast cooperative effort.

"We have added seven members to the brotherhood of cosmic pyromaniacs, because of the experiments in the Glovebox," Nicollier said. "I would like to thank NASA and the European Space Agency for letting me do this. I would like to thank the Italian Space Agency for letting a non-Italian, non-American handle a joint program between Italy and the U. S. I feel very privileged."

Guidoni praised the efforts of JSC, Marshall Space Flight Center, Kennedy Space Center and agencies in Italy.

"I bring with me the memory of a fantastic journey in space," Guidoni said. "This mission would not have been possible without the joint effort of hundreds of people."

Cheli also praised his crew mates.

"As a rookie or a first time flyer I could not have chosen a better flight and this mission, which was characterized by its multi-disiplanary science investigations and challenging flight operations," Cheli said.

Hoffman was proud to have taken part in something that had never before been accomplished.

"We set out to take a giant leap and in the end maybe we just took a big step but it was a big step and an important one," Hoffman said. "It makes me proud to know that at least we had the guts to try to do something that was hard, because that's what this program has been all about ever since President Kennedy reminded us that we were going to the Moon not because it was easy but because it was hard. If we ever lose the will and the ability to try to do hard things just because we don't know if they are going to work then we've forgotten what the program is all about."

Chang-Diaz heralded the success of science data collection.

"This mission was a scientific success," Chang-Diaz said. "We have some engineering things to do to perfect the techniques of tether operations but in fact the science of the mission was amply proven and we returned home with a virtual bounty of scientific data to share with all of the people of the world."

PMA luncheon series continues

The NASA/Houston Chapter of the Performance Management Association is conducting its fifth and final luncheon meeting on the implementation of Earned Value Management Systems at JSC.

The meeting will begin at 11:15 a.m. March 28 at the Ramada Inn on NASA Road 1.

The focus for this meeting will be to inform the audience on various commercial products available for Earned Value/Performance Management Systems. The meeting will include vendor demonstrations from C/S Solutions, CSC Artemis, Welcom, Mantix, and Microframe Technologies.

Tickets cost $12 and include lunch. Reservations are due March 22.

For more information call to Susan Widmer at x34299 or e-mail at Widmer@GP905.jsc.nasa.gov

Pilots offer variety of experience

(Continued from Page 1)

Cagle's has logged many hours in the air providing medical support and rescue in aeromedical missions. While assigned as a rated flight surgeon, she was deployed to Saudi Arabia during Desert Shield. Cagle also has serve as Air Force medical liaison officer for STS-30, and currently practices as an occupational physician at the JSC Clinic. She is a member of the NASA working group to establish international medical standards and procedures for astronauts.

Wells was accepted into the third class of women Air Force pilot training. She flew the WC-130 "Typhoon Chaser" while assigned to the 54th Weather Reconnaissance Squadron in Guam and was called up for Desert Storm, during which time she amassed more than 600 hours of flying. In her assignment as a NASA staff pilot, she has served as pilot of T-38's, Gulfstream G-I, the KC-135 and as program manager for the mission specialist training airplane.

Collins served as pilot on STS-63, the first flight of the joint Russian-American program. She was the first woman pilot of a space shuttle.

These panel members will share their unique experiences as well as women's involvement in flight. All JSC employees are invited to attend. The meal is $8.50 per person. Tickets must be purchased in advance and will be available on March 18.

For more information, contact Jessie Hendrick at x31203.

Space News Roundup

The **Roundup** is an official publication of the National Aeronautics and Space Administration, Lyndon B. Johnson Space Center, Houston, Texas, and is published every Friday by the Public Affairs Office for all space center employees.

Editor .....Kelly Humphries
Managing Editor .....Karen Schmidt

Correction

In the March 8 issue of the Space News Roundup, STS-76 crew members were incorrectly identified. At left is, Pilot Rick Searfoss and assisting the STS-76 crew is Astronaut Marsha Ivins, right.

Volunteers sought for bone research

The Medical Sciences Division in the Space and Life Sciences Directorate has teamed up with Baylor College of Medicine to evaluate new techniques to measure bone quality and is seeking volunteers to participate in the study.

"This study will help develop new techniques that will enable the astronauts living and working on the International Space Station determine how their bone quality may be changing in low-Earth orbit," said Jerry Homick, deputy chief of the Medical Sciences Division.

Men and women ranging in age from 30 to 80 years of age are being sought to help evaluate new ultrasound and low-frequency vibration techniques that measure bone quality. Several non-invasive tests will be performed and compared with standard bone mineral density testing.

Subjects will be asked to fill out an information sheet and sign a consent form prior to being enrolled. If chosen to participate in this study, volunteers will receive a free copy of their bone mineral density results.

Employees interested in volunteering or for more information, call 793-1131 or e-mail tonir@bcm.tmc.edu

NASA-JSC